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NATIONAL DAM SAFETY PROGRAM. BLACK CREEK LAKE DAM (INVENTORY NU--ETC(U)
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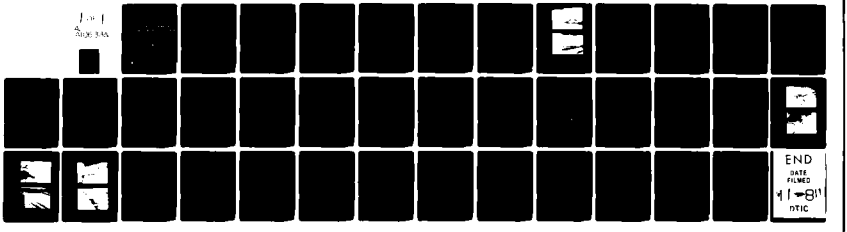
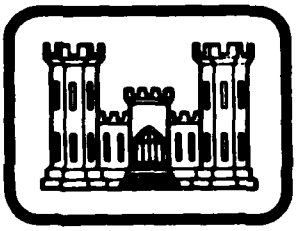


TENNESSEE RIVER BASIN

Name Of Dam: BLACK CREEK
Location: WISE COUNTY
Inventory Number: VA 19513

LEVEL II

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



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NORFOLK DISTRICT CORPS OF ENGINEERS
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IN CONJUNCTION WITH

COMMONWEALTH OF VIRGINIA
STATE WATER CONTROL BOARD

JULY 1981

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20. Abstract

Pursuant to Public Law 92-367, Phase I Inspection Reports are prepared under guidance contained in the recommended guidelines for safety inspection of dams, published by the Office of Chief of Engineers, Washington, D. C. 20314. The purpose of a Phase I Inspection is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general conditions of the dam is based upon available data and visual inspection. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

Based upon the field conditions at the time of the field inspection and all available engineering data, the Phase I report addresses the hydraulic, hydrologic, geologic, geotechnic, and structural aspects of the dam. The engineering techniques employed give a reasonably accurate assessment of the conditions of the dam. It should be realized that certain engineering aspects cannot be fully analyzed during a Phase I inspection. Assessment and remedial measures in the report include the requirements of additional indepth study when necessary.

Phase I reports include project information of the dam appurtenances, all existing engineering data, operational procedures, hydraulic/hydrologic data of the watershed, dam stability, visual inspection report and an assessment including required remedial measures.

TENNESSEE RIVER BASIN

NAME OF DAM: BLACK CREEK LAKE
LOCATION: WISE COUNTY
INVENTORY NUMBER: VA 19513

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

(6) National Dam Safety Program. Black Creek Dam (Inventory Number VA 19513), Tennessee River Basin, Wise County, Virginia. Phase I Inspection Report.

(9) Final rpt.,

(10) Boris O. Toran

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of the Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (flood discharges that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the design flood should not be interpreted as necessarily posing a highly inadequate condition. The design flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

BRIEF ASSESSMENT OF DAM

Name of Dam:	Black Creek Lake Dam
State:	Virginia
Location:	Wise County
USGS Quad Sheet:	Norton, Virginia
Stream:	Black Creek
Date of Inspection:	9 June 1981

Black Creek Lake Dam is an earthfill structure approximately 400 feet long and 21.9 feet high. The dam is owned and maintained by Greater Wise, Inc. The dam is classified as a small size dam with a significant hazard classification. The primary spillway consist of five 6-inch diameter PVC pipes passing through the concrete wier forming the secondary spillway. The secondary spillway is a 9.5-foot long concrete wier across a concrete channel located in the embankment near the right abutment. The reservoir is used for recreation.

Based on criteria established by the Department of the Army, Office of the Chief of Engineers (OCE), the Spillway Design Flood (SDF) is the 100-Year Flood. The spillways will pass 16 percent of the PMF or about 50 percent of the SDF without overtopping the dam. Flows overtopping the dam during the SDF are not considered detrimental to the embankment. The spillways are adjudged as inadequate but not seriously inadequate.

The visual inspection revealed no apparent problems and there are no immediate needs for remedial measures. Maintenance is performed by the owners. However, there is no regular maintenance operation program or emergency operations and warning plan. It is recommended that a regular maintenance and operations program be instituted with provisions for accurate records of all maintenance performed. It is also recommended that a warning system be established and that the maintenance items listed in Section 7.2 be accomplished as part of the regular maintenance program within the next 12 months.

Submitted By:

Original signed by:
Carl S. Anderson, Jr.

CARL S. ANDERSON, Jr.
Acting Chief, Design Branch

Approved:

Original Signed by:
Michael M. Jenks

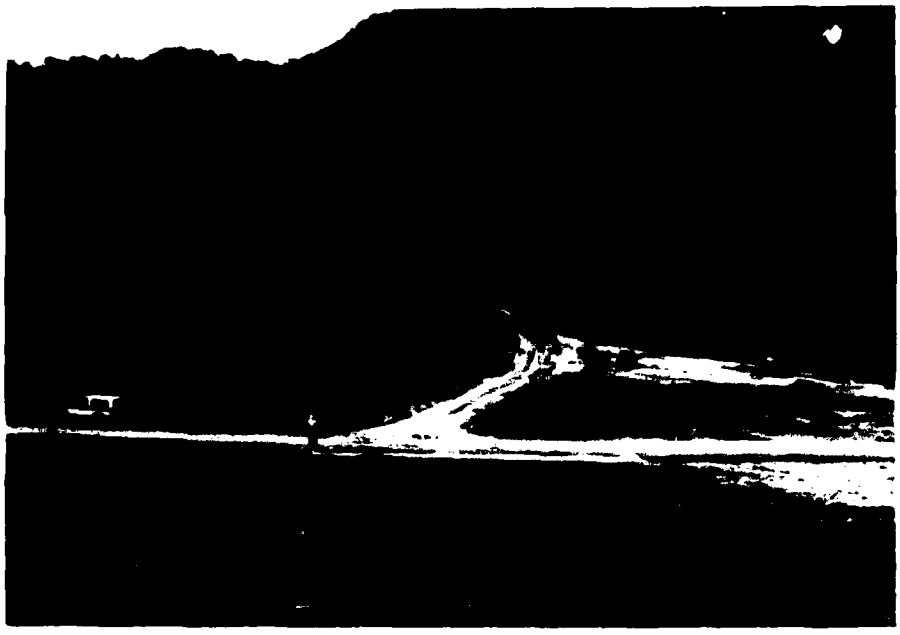
RONALD E. HUDSON
Colonel, Corps of Engineers
Commander and District Engineer

Date: SEP 16 1981

Recommended By

Original signed by
JACK G. STARR

JACK G. STARR
Chief, Engineering Division



DAM

RESERVOIR

OVERALL VIEWS
BLACK CREEK DAM
9 JUNE 1981

SECTION 1

PROJECT INFORMATION

1.1 GENERAL:

1.1.1 Authority: Public Law 92-367, 8 August 1972, authorized the Secretary of the Army, through the Corps of Engineers to initiate a national program of safety inspections of dams throughout the United States. The Norfolk District has been assigned the responsibility of supervising the inspection of dams in the Commonwealth of Virginia.

1.1.2 Purpose of Inspection: The purpose is to conduct a Phase I inspection according to the Recommended Guidelines for Safety Inspection of Dams (Reference 1, Appendix IV). The main responsibility is to expeditiously identify those dams which may be a potential hazard to human life or property.

1.2 Project Description:

1.2.1 Dam and Appurtenances: Black Creek Lake Dam is an earthfill embankment approximately 400 feet long and 22.5 feet high. The crest of the dam has a minimum width of 75 feet and an average crest elevation of 2198.4 MSL.* The upstream slope is 1.75 horizontal to 1.0 vertical (1.75H: 1V). The downstream slope is 2.5H:1V

The embankment has undergone some major modifications in the past. This consists mainly of building up and extending the downstream side of the dam. The most recent work consisted of regrading the left abutment and removing some old structures. It is unknown if the dam was keyed into the foundation or if a drainage system was installed. There are no foundation drain outlets.

The primary spillway consist of five 6-inch PVC pipes with an invert elevation of 2193.8. These pipes pass through a concrete wier crossing a 9.5-foot wide channel in the embankment near the right abutment. This weir is the control section for the secondary spillway and has crest elevation of 2195.0. The base of the channel is concrete and the side walls are cinderblock.

A bridge constructed from old railroad rails spans the discharge channel of the emergency spillway immediately below the control section. This bridge carries a gravel road which traverses the entire crest of the dam.

1.2.2 Location: Black Creek Lake Dam is located on Black Creek about 2.7 miles northwest of the city limits of Norton, Virginia. (See Location Plan, Plate I).

1.2.3 Size Classification: The dam is classified as a small structure as defined by Reference 1 of Appendix IV.

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* MEAN SEA LEVEL

1.2.4 Hazard Classification: The dam is located approximately one mile upstream of a home on Black Creek. Therefore, a significant hazard classification is given for this structure according to guidelines contained in Section 2.1.2 of Reference 1, Appendix IV. The hazard classification used to categorize dams is a function of location only and has nothing to do with their stability or probability of failure.

1.2.5 Ownership: Greater Wise, Inc. (a private corporation)

1.2.6 Purpose: Recreation.

1.2.7 Design and Construction History: The exact date of construction is unknown but the owner indicated that it was built in the early part of this century. No design information was available. It was built by a railroad and was later acquired by the New York Mining Company. The New York Mining Company was then acquired by Greater Wise, Inc.

1.2.8 Normal Operational Procedures: Water passes automatically over the spillways crest as the level in the reservoir rises above their crest.

1.3 Pertinent Data:

1.3.1 Drainage Area: The dam controls a drainage area of 0.56 square miles.

1.3.2 Discharge at Dam Site: The maximum known reservoir level occurred in the 1977 flood and the owner thought the dam was not overtopped.

Pool level at crest of dam

Spillway . . . . . 191 cfs.

1.3.3 Dam and Reservoir Data: Pertinent data on the dam and reservoir are shown in the following table:

TABLE 1.1 DAM AND RESERVOIR DATA

Item	Elevation feet msl	Reservoir Capacity Area, acres	Acre, feet	Watershed, inches	Length feet
Crest of Dam	2198.4	12.5	117	3.9	2200
Spillway					
Primary	2193.8	9.8	80	2.7	1800
Secondary	2195.0	10.4	89	3.0	1900
Streambed at Downstream Toe of Dam	2175.9	--	--	--	--

SECTION 2

ENGINEERING DATA

2.1 Design: There is no known design information.

2.2 Construction Records: There are no known construction records.

2.3 Evaluation: There is insufficient information to evaluate the foundation and embankment stability.

SECTION 3

VISUAL INSPECTION

3.1 Findings:

3.1.1 General: The results of the 9 June 1981 inspection are recorded in Appendix III. At the time of the inspection, the weather was overcast and mild. The temperature was 75-80°F and the ground conditions were dry. The pool elevation was 2195.0 MSL or at the crest of the secondary spillway. The tailwater was 2176.6 MSL. Water was flowing over the secondary spillway crest. There are no known prior inspection reports.

3.1.2 Embankment: The embankment is in good condition. A sketch showing a plan view and cross section is provided on Plate II, Appendix I. An overall view of the dam is provided at the beginning of the report.

There are no signs of surface cracks, unusual movement, sloughing, or cracking at or beyond the toe. The vertical and horizontal alignment of the crest are good. No riprap was observed.

There is an erosion gulley 40 feet to the left of the spillway on the downstream face. Also a wave berm has formed along the entire upstream face of the dam.

There was water flowing from the downstream toe of the embankment near its center. This discharge probably originates from the pool located below the spillway discharge channel. The water flows from the pool through the shale boulders making up the downstream face of the dam.

The crest and upstream face of the dam have a good grass cover (See Photo 3, Apendix II) with the exception of an area near the left abutment that was recently regraded. This area has been seeded and grass is starting to grow. The downstream face is overgrown with a dense ground cover and underbrush (See Photo 2, Appendix II) and two evergreen trees are growing on the crest of the dam. The crest is traversed by a crushed rock stabilized roadway.

3.1.3 Spillway: The concrete spillway channel was in good condition. The approach channel was fairly clear of obstructions with the exception of debris from the collapsed right wing wall and broken PVC pipes. The concrete wier forming the control section of the secondary spillway was in good condition. The five PVC pipes passing below the wier crest forming the primary spillway were discharging little water and are partially blocked. The blockage of these pipes does not effect the capacity of the spillway and therefore it is not essential that they be returned to working order. There is a wire screen trash rack located over the wier of the control section.

The discharge channel was clear of obstructions and in good condition. Discharge from the discharge channel flows into a pool at the right downstream toe with no apparent outlet. This pool is probably the source of the discharge coming from the toe of the dam mentioned in Section 3.1.2. There is some erosion left and right of the end of the concrete slab at the end of the discharge channel.

A bridge crosses the discharge channel immediately below the control section of the spillway and is in good condition.

3.1.4 Instrumentation: There is no instrumentation on the dam.

3.1.5 Reservoir Area: The reservoir slopes are steep and mountainous with some old strip benches. With the exception of the strip benches, which were grass covered, the reservoir area was heavily wooded. The inspection team was unable to evaluate the reservoir sedimentation.

3.1.6 Downstream Channel: The downstream channel slopes are moderately steep and heavily wooded. One house is located approximately one mile below the dam.

3.2 Evaluation: Overall the dam appeared to be in good condition. The inspection revealed certain preventive maintenance items which should be scheduled as part of an annual maintenance program. These are:

a. Monitor the erosion gully on the downstream face and repair it if it continues to get larger.

b. Place crushed rock stabilization on the road traversing the crest.

c. At a period of low discharge through the spillway, determine if the discharge from the toe of the dam is proportionately lower. Monitor this discharge on a regular basis for turbidity or increase inflow. If the discharge remains high during periods of low flow or if turbidity or an increase in flow is noted, a qualified geotechnical engineer should be contacted to evaluate the problem.

d. The dense ground cover and underbrush on the downstream face should be removed and a good grass cover established.

e. Continue efforts to establish grass cover in the reworked areas.

f. Cut off the evergreen trees on crest even with the ground surface.

g. Repair right wing wall to approach channel and remove debris and old pipes.

h. If the trash rack is not designed to break away during high spillway discharges it should be removed.

i. The discharge channel, below the concrete portion of the spillway, should be regraded so that water flows directly into the stream below the dam and not through the shale boulders forming the downstream face of the dam.

j. Repair the erosion at the end of the spillway slab with compacted fill and reseed.

k. A staffgage should be installed in the reservoir to extend above the crest of the dam.

SECTION 4

OPERATIONAL PROCEDURES

4.1 Procedures: The normal storage pool is 2838.56 ft. msl, which is the crest of the secondary spillway. The reservoir provides recreation. Water passes automatically over the spillways crest as the reservoir level rises. No facilities are provided for dewatering the reservoir.

4.2 Maintenance: The owner mows the crest and upstream face of the dam regularly. Other than this there is no formal maintenance program.

4.3 Warning System: At present time, there is no warning system or emergency operation plan for Black Creek Lake Dam.

4.4 Evaluation: The dam does not require an elaborate operation and maintenance procedure. However, a regular formal maintenance procedure should be established with documentation to include vegetation removal on the embankment and a warning plan should be developed. It is recommended that a formal emergency procedure be prepared and furnished to all operating personnel and the county emergency services coordinator. This should include:

a. How to operate the dam during an emergency.

b. Who to notify, including public officials, in case evacuation from the downstream area is necessary.

SECTION 5

HYDRAULIC/HYDROLOGIC DATA

5.1 Design: None were available.

5.2 Hydrologic Records: None were available.

5.3 Flood Experience: The maximum known pool occurred during the 1977 flood. Its exact elevation is unknown.

5.4 Flood Potential: The 100-Year Flood, 1/2 PMF and PMF were developed by use of the HEC-1 computer program (Reference 2, Appendix IV) and routed through the reservoir using the NWS-Dambreak computer program (Reference 3, Appendix IV). Clark's Tc and R coefficients for the local drainage area were estimated from basin characteristics. The rainfall applied to the developed unit hydrograph was obtained from National Weather Service Publications (Reference 4 and 5, Appendix IV).

5.5 Reservoir Regulation: Pertinent dam and reservoir data are shown in Table 1.1.

Water passes automatically through the spillways as the reservoir rises above their crests.

The storage curve was developed based on areas obtained from a contour map provided by the owner and prepared by Continental Aerial Surveys, Inc. in 1978. Survey data taken during the inspection was correlated to this map to help develop the area storage data. In routing hydrographs through the reservoir, it was assumed that the initial pool level was the secondary spillway crest (elevation 2195.0).

5.6 Overtopping Potential: The probable rise in the reservoir and other pertinent information on reservoir performance is shown in the following table:

Table 5.1 RESERVOIR PERFORMANCE

Item	Normal Flow	100 Year Flood 1/	1/2 PMF	PMF 2/
Peak flow c.f.s.				
Inflow	.5	1037	2591	5182
Outflow	.5	755	2484	4986
Maximum elevation ft. msl		2199.1	2200.2	2201.3
Non-overflow section (el 2198.4)				
Depth of flow, ft	-	.7	1.8	2.9
Duration, hrs	-	1.3	5.9	9.9
Velocity, fps 3/	-	3.8	6.2	7.9
Tailwater elevation ft. msl.	2176.6	----	----	----

1/ The 100-Year Flood has one chance in 100 of occurring in any given year.
2/ The PMF is an estimate of flood discharges that may be expected from the most severe combination of meteorologic and hydrologic conditions that are reasonably possible in the region.
3/ Critical Velocity

5.7 Reservoir Emptying Potential: There are no facilities for dewatering the reservoir.

5.8 Evaluation: Based on the size (small) and hazard classification (significant) the recommended Spillway Design Flood is the 100-Year Flood to the 1/2 PMF. Because of the risk involved, the 100-Year Flood has been chosen as the SDF. The spillways will pass 16 percent of the PMF or about 50 percent of the SDF without overtopping the crest dam. The SDF will overtop the dam by a maximum .7 feet, reach an average critical velocity of 3.8 feet per second (fps), and flow over the dam for 1.3 hours.

Conclusions pertain to present day conditions. The effect of future development on the hydrology has not been considered.

SECTION 6

DAM STABILITY

6.1 Foundation and Abutments: There is no information available on the foundation conditions, except what can be inferred from geologic and soils studies of the area which lies within the Appalachian Plateau geologic province. The Geologic Map of Virginia indicates that the area of the dam is near the eastern edge of the Wise Formation, which consists of sandstone and shale with many coal beds. Adjacent to the Wise Formation on the east is found Gladeville sandstone (sandstone, quartzose, gray and coarse-grained) and the Norton Formation, also characterized by sandstone and shale with coal beds. The depths to bedrock at the site should be relatively shallow, and numerous outcrops and boulders, predominantly of shale, are apparent in the vicinity of the dam.

The soil in the area are generally fairly shallow friable fine grained soils derived from noncalcareous shales and sandstones, with slow to moderate internal drainage. These are typically yellow, brown, or gray in color and often contain considerable quantities of rock fragments. The soils map for Wise County identifies at the dam site the following types: (1) Philo loam-alluvial fine sandy clay along the Black Creek streambed; (2) Coeburn-Muskingum complex - residual silty clay and fine sandy clay; (3) Leadvale loam - local wash sandy clay loam; and (4) Jefferson stony loam - colluvial very fine sandy clay loam. The descriptions given here of these four are representative of the lower horizons of these soil types, from which material used in the construction of the dam would most likely have been taken, and upon which the embankment would rest in any places where it was not placed directly on bedrock.

This site appears to afford a good foundation for the dam. It is likely that the embankment may rest to a large degree on the bedrock noted at relatively shallow depths on the site. It is not known whether a cutoff trench or other means was used to directly key the dam into the foundation. There is no evidence that the dam has a foundation drainage system, but seepage does not appear to be a problem, although the underbrush at the toe of the dam makes this difficult to evaluate. If the rock underlying the dam is weathered or fractured to a considerable degree, as are some of the outcrops in the vicinity, the potential for appreciable seepage exists. Should the dam be underlain by clay shales, which may break down rapidly when exposed to water, a sliding failure would be possible if there was considerable seepage passing through the foundation. The potential for seepage beneath the dam and the possible presence of clay shales cannot be determined in the absence of any subsurface data. However, the dam has been in place for many years and there is no evidence of problems related to the foundation and abutments.

6.2 Embankment:

6.2.1 Material: There is no information recorded on the nature of the embankment materials, but it is likely that the source of borrow for the dam was located in the vicinity of the impoundment, with a considerable portion probably coming from within the area presently

covered by the lake. As noted, the area soils are typically silty clays and fine sandy clays of medium plasticity, often containing a considerable quantity of rock fragments.

6.2.2 Stability: There are no available stability calculations. The dam is 21.9 feet high and has a minimum crest width of 75 feet. A crushed rock stabilized road traverses the crest of the dam. The upstream slope is 1.75H:1V and the downstream slope is 2.5H:1V. The dam is not subjected to a sudden drawdown because there is no low level drain. The existing pool is approximately at maximum control storage pool, which is the elevation of the crest of the secondary spillway (approximately 3.5 feet below the crest of the dam). The dam routinely experiences maximum control storage pool with no side effects, except for slight erosion of the spillway discharge channel beyond the end of the concrete control section.

According to the guidelines presented in Design of Small Dams, U. S. Department of the Interior, Bureau of Reclamation, the slopes recommended for a homogeneous small dam of similar material not subjected to a rapid drawdown are 3H:1V upstream and 2.5H:1V downstream. The recommended crest width is 14 feet. Based on these guidelines, the Black Creek Lake dam has an adequate downstream slope, an inadequate upstream slope, and a crest width more than five times the recommended minimum width.

6.2.3 Seismic Stability: The dam is located in Seismic Zone 2. Therefore, according to the Recommended Guidelines for Safety Inspection of Dams, the dam is considered to have no hazard from earthquakes provided static stability conditions are satisfactory and conventional safety margins exist.

6.3 Evaluation: There is insufficient information to adequately evaluate the stability of the dam. However, the visual inspection revealed no apparent instability. Based on the visual inspection, the foundation is considered sound. Based on the Bureau of Reclamation guidelines, the downstream slope is adequate, the upstream slope is inadequate, and the crest width is more than five times the recommended minimum, which enhanced the overall stability of the structure. The embankment is considered stable during both normal pool and maximum storage pool operations, which in this case are the same. In addition, overtopping is not a problem because during the Spillway Design Flood (100-Year Flood), flows are of less than one foot in depth, are of relatively brief duration (1.3 hours), and the average critical velocity is only 3.8 feet per second, less than the 6 fps which is the effective eroding velocity for a vegetated earth embankment. A stability check is not required.

SECTION 7

ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment: The available engineering data is insufficient to evaluate the embankment stability. The visual inspection revealed no findings that proved the dam to be unsound. The dam is maintained by the owner. However, there is no regular maintenance operations program or emergency operations and warning plan. Based on criteria established by the Department of the Army, Office of the Chief of Engineers (OCE), the Spillway Design Flood (SDF) is the 100-Year Flood. The spillways will pass 16 percent of the PMF or 50 percent of the SDF without overtopping the dam. Flows overtopping the dam during the SDF are not considered detrimental to the embankment. The capacity of the spillway is adjudged inadequate but not seriously inadequate. Overall the dam is in good condition and there is no immediate need for remedial measures. A stability check of the dam is not required.

7.2 Recommended Remedial Measures: It is recommended that a regular maintenance operation program be instituted and documented for future reference. A formal emergency procedure should be prepared and furnished to all operating personnel and the local emergency services coordinator. This should include how to operate the dam during an emergency and who to notify, including public officials, in case evacuation from the downstream area is necessary. Also the inspection revealed the following maintenance items that should be scheduled by the owner during a regular maintenance period within the next 12 months.

a. Monitor the erosion gully on the downstream face and repair it if it continues to get larger.

b. Place crushed rock stabilization on the road traversing the crest.

c. At a period of low discharge through the spillway, determine if the discharge from the toe of the dam is proportionally lower. Monitor this discharge on a regular basis for turbidity or increase in flow. If the discharge remains high during periods of low spillway discharge or if turbidity or an increase in flow is noted a qualified geotechnical engineer should be contacted to evaluate the problem.

d. The dense ground cover and underbrush on the downstream face should be removed and a good grass cover established.

e. Continue efforts to establish grass cover in the reworked areas.

f. Cut off the evergreen trees on crest even with the ground surface.

g. Repair right wing wall to approach channel and remove debris and old pipes.

h. If the trash rack is not designed to break away during high spillway discharges, it should be removed.

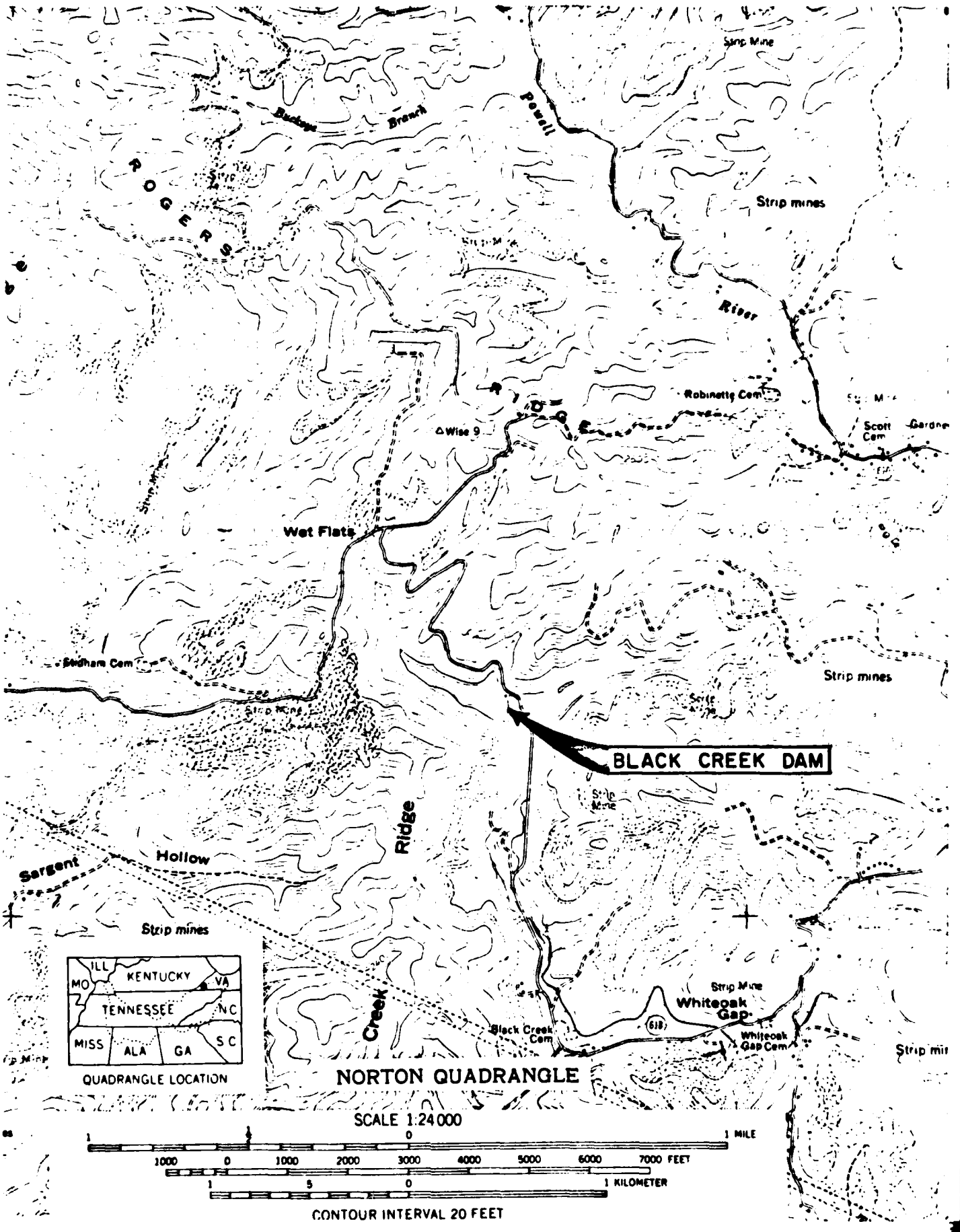
i. The discharge channel below the concrete portion of the spillway should be regraded so that water flows directly into the stream below the dam and not through the shale boulders forming the downstream face of the dam.

j. Repair the erosion at the end of the spillway with compacted fill and reseed.

k. A staffgage should be installed in the reservoir to extend above the crest of the dam.

APPENDIX I

MAPS AND DRAWINGS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Powell
Strip mines
Robinette Cem
Wise 9
Wet Flats
Bledsoe Cem
BLACK CREEK DAM
Ridge
Hollow
Sargent
Creek
Strip mines
Strip Mine
Whiteoak Gap
Black Creek Cem
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SCALE 1:24000
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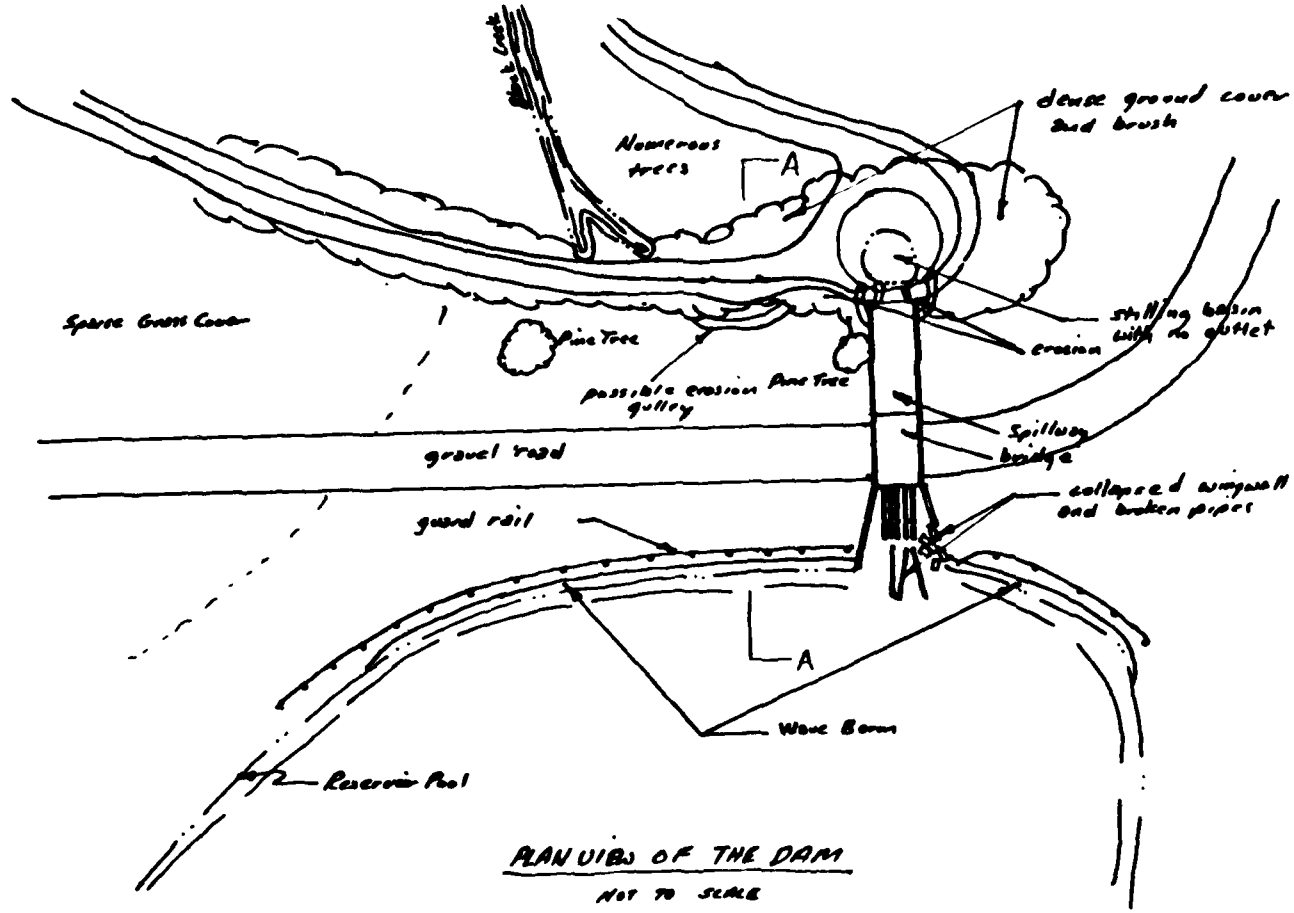
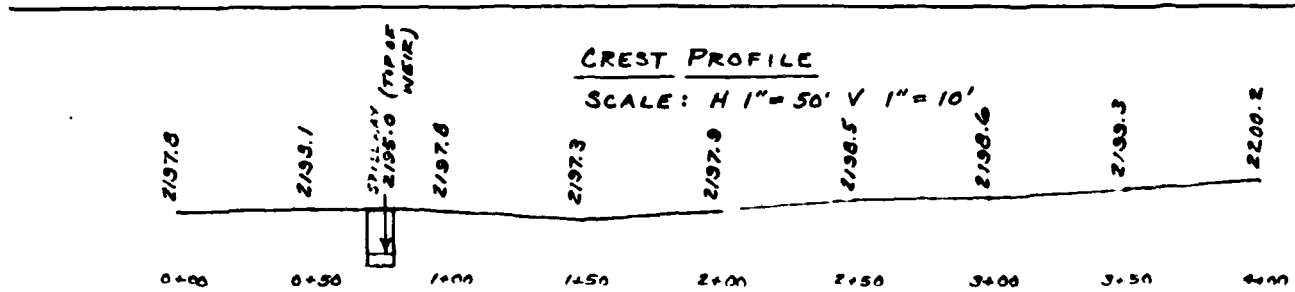
1 5 0 1 KILOMETER
CONTOUR INTERVAL 20 FEET



PLAN VIEW OF THE DAM

NOT TO SCALE

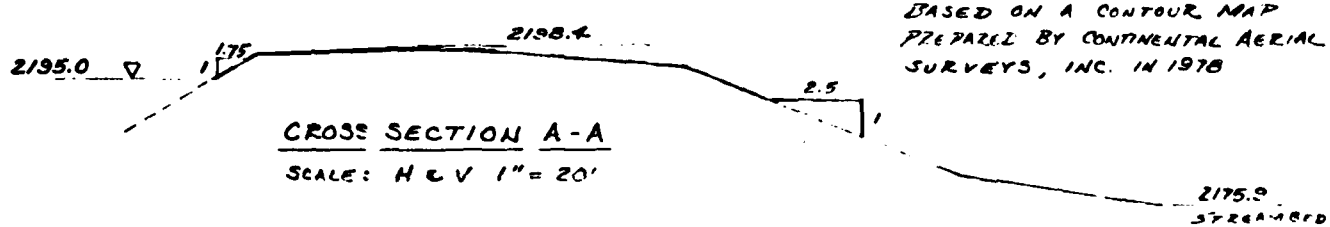
BLACK CREEK LAKE DAM
WISE COUNTY
9 JUNE 1981
PLATE II



CREST PROFILE

SCALE: H 1"= 50' V 1"= 10'

NOTE: ELEVATIONS ARE REFERENCED TO TEMPORARY BENCH MARK ON END OF PIPE GUARD RAIL AT RIGHT ABUTMENT, ELEV. 2198.4, BASED ON A CONTOUR MAP PREPARED BY CONTINENTAL AERIAL SURVEYS, INC. IN 1978



CROSS SECTION A-A

SCALE: H & V 1"= 20'

BLACK CREEK LAKE DAM

WISE COUNTY, VIRGINIA

9 JUNE 1981

MAP

APPENDIX II

PHOTOGRAPHS

PHOTO #1 CREST

PHOTO #2 DOWNSTREAM FACE

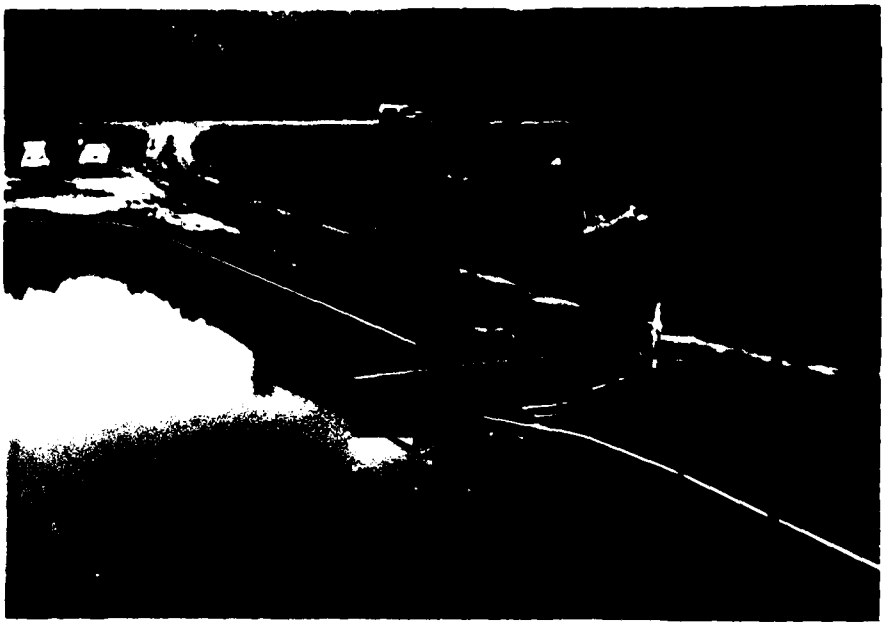


PHOTO #3 UPSTREAM FACE AND SPILLWAY APPROACH CHANNEL

PHOTO #4 SPILLWAY CONTROL SECTION

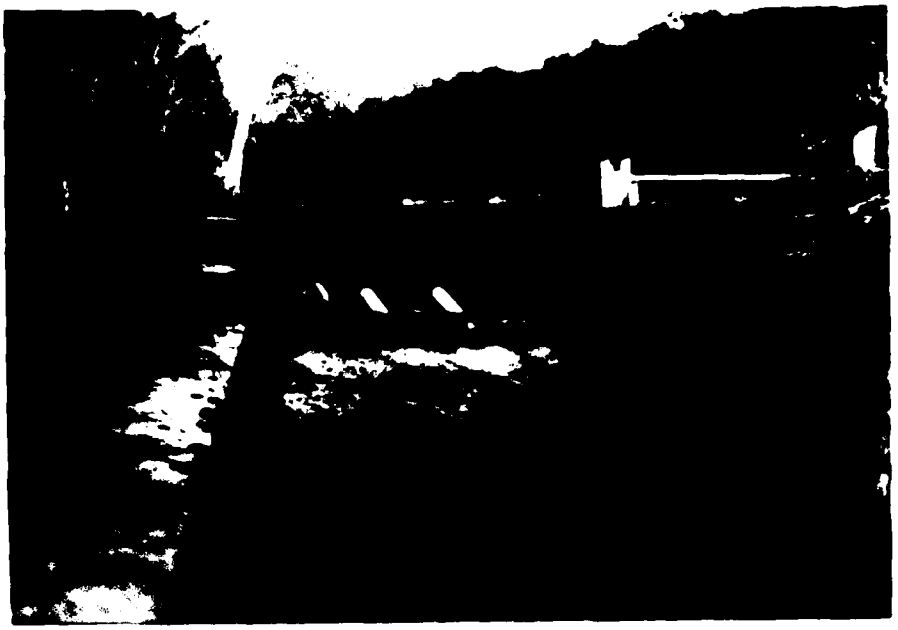


PHOTO #5 SPILLWAY

PHOTO #6 SPILLWAY DISCHARGE CHANNEL

APPENDIX III

FIELD OBSERVATIONS

Check List
Visual Inspection
Phase I

Name Dam: Black Creek Lake County: Wise State: Virginia Coordinates: 36-58.1 Lat 82.40.8 Long

Date of Inspection: 9 Jun 81 Weather: Overcast Temperature: 80° F

Pool Elevation at Time of Inspection: 2195.0 MSL Tailwater at Time of Inspection: 2176.6 MSL

Inspection Personnel:

Bo Taran, COE
Len Jones, COE
Dave Bushman, SWCB
Hugh Gildea, SWCB
Ed Constantine, SWCB
Bobby Tuck, Owners Repr.
Eddie Clapp, Owners Repr.

Bushman Recorder

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None observed	None.
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND	None observed	The dam has been widened in past to a minimum crest width of 75 feet.
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	There is a possible erosion gulley 40 feet to the left of the spillway on the downstream face. Also, a bench has been eroded by wave action along the upstream face at water level.	Monitor erosion gully and repairs it if it becomes necessary.
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	No unusual movement observed. A gravel roadway traverses the entire crest and is in need of more crushed rock stabilization.	Place crushed rock stabilization on roadway.
RIPRAP FAILURES	No riprap observed.	None.

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
FOUNDATION	No instability observed.	None.
ANY NOTICEABLE SEEPAGE	Discharge was flowing from the toe of the embankment near its center. This discharge probably originates from the spillway discharge flowing under the shale boulders on the downstream face.	Dense ground cover made it difficult to thoroughly evaluate this. At periods of low spillway discharge, determine if the discharge is proportionately lower.
DRAINS	None observed.	None.
MATERIALS	Silty clays and fine sandy clays	None.
VEGETATION	The crest and upstream face had a good grass cover with the exception of an area near the left abutment that was recently regraded. This area has been seeded and grass is starting to grow. The downstream face has dense ground cover and underbrush. Two evergreen trees are growing on the crest.	The dense ground cover and underbrush on the dam made it difficult to evaluate the condition of the dam and should be removed. Continue efforts to establish grass cover in reworked areas. Cut trees off at ground level.

PRIMARY AND SECONDARY SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONTROL SECTIONS	Consist of a concrete wier forming the secondary spillway crest at the downstream end of the approach channel. Five 6-inch PVC pipes pass through the wier below its crest. These pipes may have been placed in recent times to act as a primary spillway. There is a wire screen trash rack located above the wier. There are cinderblock walls at each end of the wier.	The trash rack may catch debris and block the spillway. If the rack is designed to break away during heavy discharges, this will not be a problem but if not, it could adversely effect the the spillway capacity. Little flow was passing through the PVC pipes. The blockage of these pipes does not effect the capacity of the spillway and therefore it is not essential that they be returned to functioning order.
APPROACH CHANNEL	Fairly clear of debris with the exception of debris from the collapsed right wing wall and broken PVC pipes.	Repair wing wall and remove old debris and pipes.
DISCHARGE CHANNEL	Concrete bottom with cinder block walls. Discharge from this flows into a small pool at right downstream toe with no apparent outlet. Erosion is beginning to take place left and right of the end of the concrete slab.	Regrade discharge channel so that water flows directly into the stream below the dam and not through the toe of the embankment. The eroded area at the end of the slab should be backfilled with compacted material and seeded.

PRIMARY AND SECONDARY SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
BRIDGE AND PIERS	A bridge crosses the discharge channel immediately below the control section. It consists of railroad rails acting as beams with rails perpendicular to these acting as the deck.	None.
EMERGENCY GATE	None	None.
GATES AND OPERATION EQUIPMENT	None.	None

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None.	None.
OBSERVATION WELLS	None.	None.
WEIRS	None.	None.
PIEZOMETERS	None.	None.
STAFFGAGES	None.	Install a staffgage to extend above the crest of the dam.
OTHER	None.	None.

RESERVOIR

VISUAL EXAMINATION RECOMMENDATIONS	OBSERVATIONS	REMARKS OR
SLOPES	Steep and mountainous with some old strip benches. Other areas are heavily wooded.	None
SEDIMENTATION	The inspection team was unable to evaluate	None. None

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Wooded banks with heavy vegetation.	None
SLOPES	Moderate	None
APPROXIMATE NO. OF HOMES AND POPULATION	One house approximately 1 mile below the dam.	None

APPENDIX IV

REFERENCES

APPENDIX IV

REFERENCES

1. Recommended Guidelines for Safety Inspection of Dams, Office of the Chief of Engineers, Department of the Army, Washington, D. C.

2. HEC-1 Flood Hydrograph Package, (Hydrologic Engineering Center, U. S. Army Corps of Engineers, January 1973.)

3. NWS-Dambreak Computer Model, (Office of Hydrology, National Weather Service (NWS), Silver Spring, Maryland, September 1980).

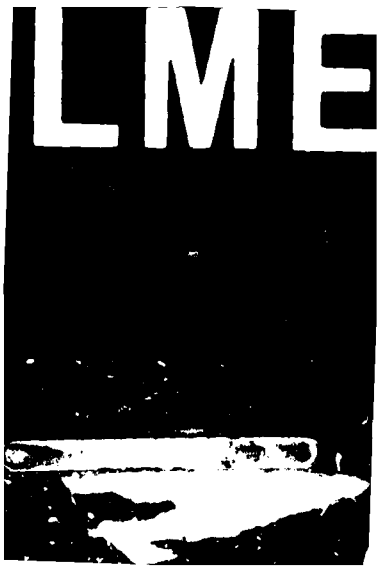
4. "Probable Maximum Precipitation Estimates, United States East of the 105th Meridian, "Hydrometeorological Report No. 51, (National Weather Service, June 1978).

5. "Rainfall Frequency Atlas of the Unites States", Technical Paper No. 40, (U.S. Weather Bureau, May 1961).

6. Bureau of Reclamation, U. S. Department of the Interior, Design of Small Dams. A Water Resources Technicla Publication, Revised Reprint, 1977.

7. "Geologic Map of Virginia", Virginia Division of Mineral Resources, 1963.

8. "Soil Survey, Wise County, Virginia", Soil Conservation Service, U. S. Dept. of Agriculture, 1954.


LME